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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,422	09/29/2000	Akira Yamaguchi	09792909-0431	3868

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/675,422

Applicant(s)

YAMAGUCHI ET AL.

Examiner

Susy N Tsang-Foster

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-15 and 17-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 13-15 and 17-29 is/are rejected.
- 7) ☒ Claim(s) 7-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 12/11/2003. Claims 1 and 13 have been amended and claims 28 and 29 have been added. Claims 9, 10, 11, 19 and 24 have been amended and are not original claims. Claims 4 and 16 have been cancelled.

Previous art rejections based solely on JP 09-027344 are withdrawn since the terms positive electrode and negative electrode are definite terms in the context of a battery that is claimed.

Previous art rejections based on Kaneda et al. are withdrawn for the following reasons:

The closest prior art of record, Kaneda et al. (US 2003/0129494 A 1) disclose embedding the negative active material inside the carbonaceous material to form a composite negative electrode (see paragraphs 29 and 30) where the embodiments of the reference having the negative active material embedded in the carbon material satisfy at least one, or at least two of the four requirements in paragraph 24 of the reference: (1) the carbonaceous material has a (002) interplanar spacing of 0.3350 nm to 0.3650 nm by X-ray diffractometry, (2) the carbonaceous material has a peak intensity ratio of 1360 cm^{-1} to 1580 cm^{-1} being a 0.15 to 2.0 by argon laser Raman spectrometry, (3) the oxide particles (negative electrode material) have a mean particle size of not more than 10 microns, and (4) the negative electrode-active material has a specific surface area of 1 m^2/g to 100 m^2/g . Kaneda et al. also disclose that the size of crystallite in the C axis direction is preferably 1 nm to 100 nm (see paragraphs 34 and 35).

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However, Kaneda et al. appear to disclose carbon material being disposed in the interstices between the negative electrode active material in paragraph 97 of the reference where the carbonaceous material is scale-formed graphite having an average particle size of 10 microns and carbon fibers having an average diameter of 0.2 microns and an average length of 30 microns and the weight ratio of scaled-form graphite to the carbon fibers is 55:30. But Kaneda et al. does not disclose, teach, or suggest for this embodiment where the carbonaceous material is disposed in the interstices of the negative active material as presently claimed where the carbon flakes have a (002) interplanar spacing of less than 0.3360 nm by X-ray diffractometry and a thickness of (002) c-axis crystallites of 100 nm or more. It appears to the Examiner that the bulk density of the graphite flakes would be inherently determined by the (002) interplanar spacing of the graphite flakes.

For the record, in contrast to applicant's arguments in the amendment filed on 12/11/2003 that scaly graphite is not a flake, an article for "Graphite (C)- Classifications, Properties, and Applications of Graphite" (obtained online from Azom, 2004 [retrieved on 2004-030-03].

Retrieved from the Internet: <URL:

<http://www.azom.com/details.asp?ArticleID=1630>>) provides evidence that scaly graphite is a flake graphite.

Claims 1-3, 5-15, 17-29 are pending. Claims 7-12 are objected to as containing allowable subject matter. Claims 1-3, 5, 6, 13-15, and 17-29 are finally rejected for reasons of record and for reasons necessitated by applicant's amendment.

Claim Objections

2. Claims 9-11, 19, and 24 are objected to because of the following informalities:

The status identifiers for these claims are incorrect since these claims are not original claims but have been amended without showing the changes with markings.

Appropriate correction is required.

3. Claim 19 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 19 does not appear to further limit claim 14 since there does not appear to be a preamble drawn to a nonaqueous electrolytes secondary battery in claim 19. Claim 19 also contains an incomplete sentence and it is unclear what the preamble is.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 19-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 19 is indefinite because it is unclear what the preamble of the claim is drawn to. Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 5, 6, 13-15, 17-19, and 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0871233 A1 in view of JP 09-027344 A.

The product-by-process limitations of claims 28 and 29 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

EP 0871233 A1 discloses a nonaqueous electrolyte secondary battery comprising a positive electrode comprising a positive-electrode active material capable of intercalating/deintercalating lithium; a negative electrode comprising a negative electrode active material capable of intercalating/deintercalating lithium and a nonaqueous electrolyte solution wherein the negative electrode further comprises carbon flakes (trademark name KS-15 from

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Lonza Ltd, see for example, page 21, line 15-20) and carbon granules (see page 23, lines 15-23, lines 30-35, lines 39-50, lines 55-58; page 24, lines 1).

The positive electrode active material can be a lithium transition metal oxide given by the general expression LiMO_2 where M is at least one element selected from the group consisting of Co, Ni, Mn, Fe, Al, V and Ti (page 23, lines 47-50) and the negative electrode may be a lithium metal oxide or graphite (page 5, lines 17-20; page 9, lines 15-25; page 24, line 1). Specifically, the negative electrode active material may be carbon material that has been carbonized and has been crushed or milled which would provide a particulate negative electrode active material (page 5, lines 54-58). The negative electrode active material may also be a graphite powder which is particulate (page 6, lines 28-50 and page 17, lines 10-46). The negative electrode active material may also be crushed lithium titanium oxide (page 9, lines 20-25).

The electrolyte solution in the battery may be a mixture of ethylene carbonate and dimethyl carbonate comprising LiPF_6 as the electrolyte salt (page 8, lines 5-26; page 9, lines 50-55). Generally, the binder PVDF is used in the electrode of a lithium battery (page 9, lines 15-25).

EP 0871233 A1 does not disclose that the negative electrode comprises carbon flakes and carbon fibers.

JP 09-027344 A teaches adding 3 to 16 wt% of carbon flakes and carbon fibers to the positive electrode of a lithium battery comprising a lithium transition metal oxide expressed with LiMO_2 where M is at least one of Co, Ni, Mn, Fe, Al, V, and Ti) with the mixing ratio of carbon flakes to carbon fibers of 85:15 to 25:75 which would be a ratio by weight of .25 to 5.66 carbon fibers to carbon flakes (see abstract and paragraph 21 of machine translation). Calculations

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would indicate that this would be approximately .75 wt% of carbon flakes to 13.6wt% carbon flakes and .45 wt% carbon fiber to 12 weight percent carbon fiber in the positive electrode. JP 09-027344 A also teaches carbon fibers with the trademark name VGCF by Showa Denko KK and carbon flakes with the trademark name KS-15 are used in the positive electrode (see paragraph 121 of machine translation). Furthermore, JP 09-027344 discloses that the carbon fibers are grown in the vapor phase at 2500 °C or more (see paragraphs 46- 49 of machine translation).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the carbon granules in EP 0871233 A1 with the carbon fibers of JP 09-027344 because they both serve the same purpose of maintaining the structural integrity of the electrode during the charge/discharge cycle as taught by JP 09-027344 in paragraph 19 (see machine translation) and by EP 0871233 A1 on page 5, lines 4-8. Since the carbon fibers used in JP 09-027344 has the same trademark name as that used by applicants, and the carbon flakes used in EP 0871233 A1 has the same trademark name as that used by applicants, the carbon fibers of JP 09-027344 and the carbon flakes of EP 0871233 A1 are expected to have the properties (such as diameter, length, and thickness, interplanar spacing, bulk density) recited in the instant claims.

The court has held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP 2112 and 2112.01. When the Examiner has provided a sound basis for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the applicant to prove that the product shown in

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the prior art does not possess the characteristics of the claimed product. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use 3 to 16 wt% of carbon flakes and carbon fibers with the mixing ratio of carbon flakes to carbon fibers of 85:15 to 25:75 in the negative electrode of EP 0871233 A1 because this proportion would give sufficient conductivity and structural strength to the electrode as taught by JP 09-027344 in paragraph 51 (see machine translation). Furthermore, EP 0871233 A1 disclose that the total amount of conductive agent (carbon flakes and carbon granules) in the negative electrode is 2 to 15% by weight (page 5, lines 1-3) and that the preferred mixing ratio between carbon flakes and granulated carbon is 90:10 to 20:80, which are nearly identical to the range of 3 to 16 wt % of the total conductive agent (carbon flakes and carbon fiber) and weight ratio of 85:15 to 25:75 (carbon flakes to carbon fibers) taught in JP 09-027344.

Response to Arguments

8. Applicant's arguments filed 12/11/2003 have been fully considered but they are not persuasive.

With respect to art rejections based on EP 0871233 A1 in view of JP 09-027344 A, applicant asserts that JP 09-027344 A does not teach or suggest the claimed invention because the addition of flaky graphite and fibrous carbon to the positive electrode disclosed in JP 09-027344 A was intended to maintain the structural integrity of the LiMO_2 and there is no teaching or suggesting of adding flaky graphite to the negative electrode.

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In response, the JP 09-027344 A discloses adding carbon fibers and carbon flakes to the LiMO_2 electrode to maintain the structural integrity of the electrode where M can be Ti (see paragraph 21 of machine translation of reference). An electrode made of lithium titanium oxide is also used as a negative electrode in the battery of EP 0871233 A1 (see page 9, lines 20-25 and page 21, lines 7-12). The negative electrode active material may also be crushed lithium titanium oxide (page 9, lines 20-25). EP 0871233 discloses adding carbon flakes and carbon granules to the positive and negative electrodes (see page 3, lines 9-15) where the flaky graphite provides for satisfactory electron conductivity and the carbon granules provide for structural integrity.

It would have been obvious to one of ordinary skill in the art as stated above to substitute the carbon granules of EP 0871233 with carbon fibers of JP 09-027344 in the negative electrode of EP 0871233 when it is composed of a metal oxide such as lithium titanium oxide because the carbon fibers provide the same function as the carbon granules in the positive and negative electrodes of EP 0871233 of providing structural integrity to the positive electrode and negative electrode and when the negative electrode is made of lithium titanium oxide (see paragraph 19 of machine translation of JP 09-027344). The substitution of carbon granules with carbon fibers in the negative electrode of EP 0871233 can provide the same structural integrity as a negative electrode with carbon granules with reasonable expectation of success as evidenced by JP 09-027344 which uses the same lithium titanium oxide material as a positive electrode instead of a negative electrode. However, the JP 09-027344 reference does not disclose, teach, or suggest adding carbon fibers and carbon flakes to an electrode comprising a carbonaceous material as the electrode active material.

Applicant also asserts with respect to JP 09-027344 A that the reference does not disclose, teach, or suggest the addition of carbon fibers produced by vapor phase deposition, and carbon flakes having a (002) interplanar spacing of less than 0.336 nm by X-ray diffractometry and a thickness of (002) c-axis crystallites of 100 nm or more and the bulk density of the carbon flakes, as measured by Japanese Industrial Standard K-1469 is 0.4 g/cm³ or less, and the maximum particle size of the carbon flakes, as measured by laser diffraction, is 50 microns or less.

In response, the JP 09-027344 A discloses using carbon fibers with the trademark name VGCF by Showa Denko KK and carbon flakes with the trademark name KS-15 are used in the positive electrode (see paragraph 121 of machine translation).

Since the carbon fibers and carbon flakes used in JP 09-027344 have the same trademark names as those used by applicants in the present specification, the carbon fibers and carbon flakes of JP 09-027344 are expected to have same properties (such as diameter, length, and thickness, interplanar spacing, bulk density) recited in the present claims.

Furthermore, EP 087233A1 discloses that the graphite flakes have a (002) spacing obtained by X-ray diffraction of less than 0.336 nm, that the C-axis crystalline element thickness is 100 nm or more, that the flaky graphite has a bulk density as measured by the method described in JISK-1469 of 0.4 g/cm³ or less and that the maximum diameter measured by the laser diffraction method is 50 microns or less (see page 4, lines 17-21).

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Allowable Subject Matter

9. Claims 7-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 20 and 21 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art of record, JP 09-027344 does not disclose, teach, or suggest adding carbon fibers and carbon flakes in the recited claimed weight ratios and having the recited properties to an electrode comprising a carbonaceous material as the electrode active material.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ 

Susy Tsang-Foster
Primary Examiner
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